March 03, 2017

## Alg. 2 Warm Up #11-5

Factor then simplify:

1. $\dfrac{x + 8}{x^2 + 5x - 24}$

2. $\dfrac{x^2 - 81}{x^2 - 7x - 18}$

3. $\dfrac{4x^2 + 8x}{2x^2 - 8}$

## HW Questions:

3-78. Simplify the expressions below.

a. $\frac{x^2-8x+16}{3x^2-10x-8}$ for $x \neq -\frac{2}{3}$ or 4

b. $\frac{10x+25}{2x^2-x-15}$ for $x \neq -\frac{5}{2}$ or 3

c. $\frac{(k-4)(2k+1)}{5(2k+1)} \div \frac{(k-3)(k-4)}{10(k-3)}$ for $k \neq 3, 4,$ or $-\frac{1}{2}$

$$\frac{(k-4)}{5} \div \frac{(k-4)}{10}$$

$$\frac{(k-4)}{5} \cdot \frac{10}{(k-4)}$$

$$\frac{10(k-4)}{5(k-4)}$$

$$2$$

3-79. How many solutions does each equation below have?

a. $4x + 3 = 3x + 3$

b. $3(x - 4) - x = 5 + 2x$

c. $(5x - 2)(x + 4) = 0$

d. $x^2 - 4x + 4 = 0$

3-80. Now David wants to solve the equation $4000x - 8000 = 16{,}000$.

a. What easier equation could he solve instead that would give him the sam solution? (In other words, what equivalent equation has easier numbers work with?)

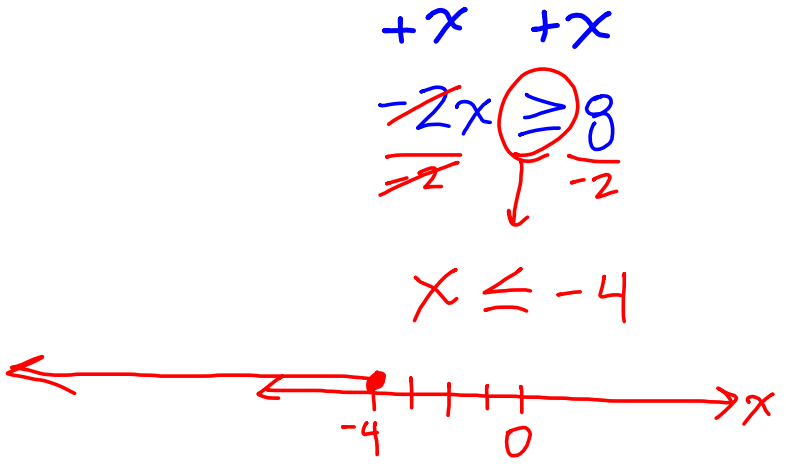
b. Justify that your equation in part (a) is equivalent to $4000x - 8000 = 16{,}0$ by showing that they have the same solution.

c. David's last equation to solve is $\frac{x}{100} + \frac{3}{100} = \frac{8}{100}$. Write and solve an equivalent equation with easier numbers that would give him the same answer.

3-81. Solve each of the following inequalities for the given variable. Represent you solutions on a number line.

a. $5 + 3x < 5$

b. $-3x \geq 8 - x$



3-82. In Lesson 3.2.3 you will focus on multiplying and dividing rational expressions. Recall what you learned about multiplying and dividing fractions in a previous course as you answer the questions below. To help you, the following examples have been provided.

$$\frac{9}{16} \cdot \frac{4}{6} = \frac{36}{96} = \frac{3}{8}$$

$$\frac{5}{6} \div \frac{20}{12} = \frac{5}{6} \cdot \frac{12}{20} = \frac{60}{120} = \frac{1}{2}$$

a. Without a calculator, multiply $\frac{2}{3} \cdot \frac{9}{14}$ and reduce the result. Then use a calculator to check your answer. Describe your method for multiplying fractions.

b. Without a calculator, divide $\frac{3}{5} \div \frac{12}{25}$ and reduce the result. Then use a calculator to check your answer. Describe your method for dividing fractions.

$$\frac{3}{5} \cdot \frac{25}{12} = \frac{3 \cdot 5 \cdot 5}{5 \cdot 3 \cdot 4}$$

$$= \frac{\cancel{3} \cdot \cancel{5} \cdot 5}{\cancel{3} \cdot \cancel{5} \cdot 4} \rightarrow = \frac{5}{4}$$

1 1

3-83. Sketch the graph of $y = (x + 2)^3 + 4$.

a. What is the parent graph of this function? How has the graph of this function been transformed from the parent graph?

$y = x^3$

left 2 up 4

b. Rewrite the equation $y = (x + 2)^3 + 4$ without parentheses. Remember the Order of Operations.

c. How would the graph in part ~~(a)~~ b differ from the graph of the original equation?

$y = (x+2)(x+2)(x+2)+4$

$= (x+2)(x^2+4x+4) + 4$

$= x^3+4x^2+4x$

$+2x^2+8x+8 + 4$

$= x^3+6x^2+12x+12$

3-84. Sketch the graph of the function $f(x) = 3 \cdot 5^x$.

a. What is the domain of $f(x)$?

b. Sketch the graph of the geometric sequence $t(n) = 3 \cdot 5^n$.

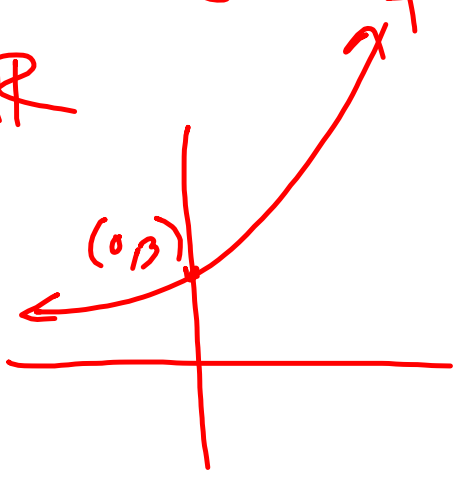
c. What is the difference between $f(x)$ and $t(n)$? Explain completely.

It is continuous

dom: $\mathbb{R}$

It is discrete

domain $n = 1, 2, 3, \ldots$

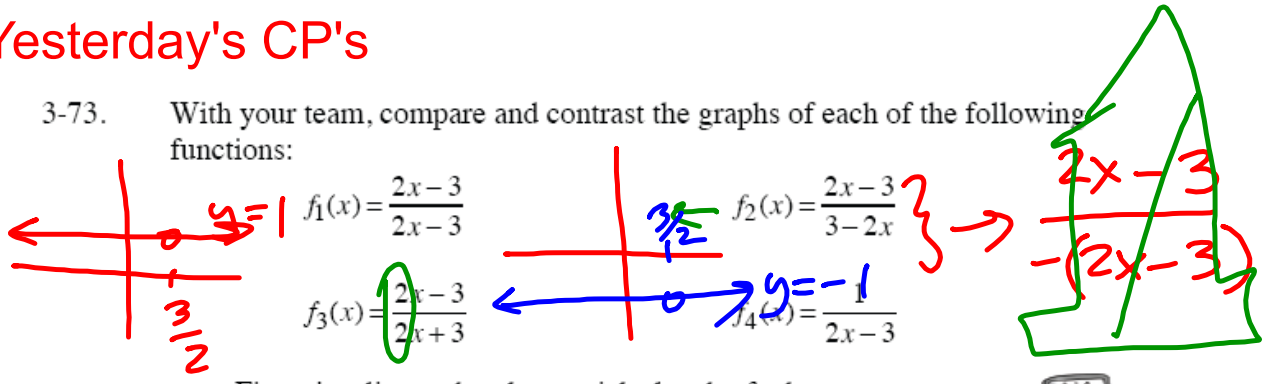


# Yesterday's CP's

3-73. With your team, compare and contrast the graphs of each of the following functions:

$f_1(x) = \frac{2x-3}{2x-3}$ $\quad f_2(x) = \frac{2x-3}{3-2x}$

$f_3(x) = \frac{2x-3}{2x+3}$ $\quad f_4(x) = \frac{1}{2x-3}$

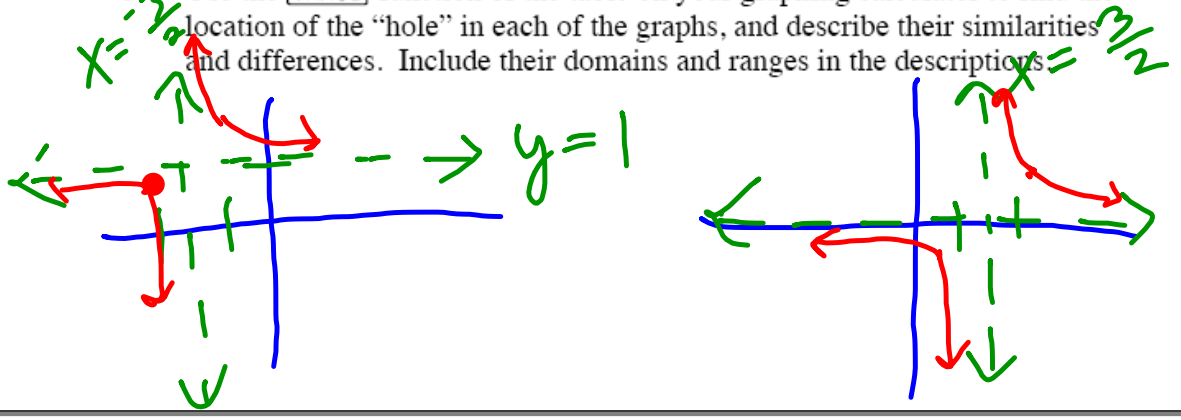



a. First visualize and make a quick sketch of what you imagine the graph of each will look like.

b. Discuss your sketches with the rest of your team.

c. Use calculators to graph each rational function, and adjust your sketches if needed.

d. Use the TRACE function or the table on your graphing calculator to find the location of the "hole" in each of the graphs, and describe their similarities and differences. Include their domains and ranges in the descriptions.



3-74. Use what you know about the number 1 to simplify each expression below, if possible. State any value(s) of the variable that would make the denominator zero.

a. $\frac{x^2}{x^2}$ b. $\frac{x}{x}\cdot\frac{x}{x}\cdot\frac{x}{3}$ c. $\frac{x-2}{x-2}\cdot\frac{x+5}{x-1}$ d. $\frac{9}{x}\cdot\frac{x}{9}$

e. $\frac{h\cdot h\cdot k}{h}$ f. $\frac{(2m-5)(m+6)}{(m+6)(3m+1)}$ g. $\frac{6(n-2)^2}{3(n-2)}$ h. $\frac{3-2x}{(4x-1)(3-2x)}$

d) $x \neq 0$

$\frac{9x}{9x} = 1$

a) $x \neq 0$

$\frac{x^2}{x^2}$

1

b) $x \neq 0$

$\frac{x}{x}\cdot\frac{x}{x}\cdot\frac{x}{3}$

$\frac{x}{3}$

c) $x \neq 1, 2$

$\frac{(x-2)}{(x-2)}\cdot\frac{(x+5)}{(x-1)}$

$\frac{x+5}{x-1}$

3-75. Mr. Wonder now tries to simplify $\frac{4x}{x}$ and $\frac{4+x}{x}$.

a. Mr. Wonder thinks that since $\frac{x}{x}=1$, then $\frac{4x}{x}=4$. Is he correct? Substitute three values of $x$ to justify your answer.

Yes

b. He also wonders if $\frac{4+x}{x}=5$. Is this simplification correct? Substitute three values of $x$ or use your calculator to compare the graphs of $g(x)=\frac{4+x}{x}$ with $h(x)=5$ to justify your answer. Remember that $\frac{4+x}{x}$ is the same as $(4+x)\div x$.

c. Compare the results of parts (a) and (b). When can a rational expression be simplified in this manner?

d. Which of the following expressions below is simplified correctly? Explain how you know.

*i.* $\frac{x^2+x+3}{x+3}=x^2$ *ii.* $\frac{(x+2)(x+3)}{x+3}=x+2$

$\frac{(4+x)}{x}=5$

$\frac{4x}{x}$

# #76

In problem 3-75, you may have noticed that *both* the numerator and denominator of an algebraic fraction must be written as a product before you can use any of the terms to create a **Giant One** (a form of the number 1). Examine the expressions below. Factor the numerator and denominator of eac fraction, if necessary. That is, rewrite each one as a product. Then look for "Giant Ones" and simplify. For each expression, assume the denominator is n zero.

a. $\frac{x^2+6x+9}{x^2-9}$ b. $\frac{2x^2-x-10}{3x^2+7x+2}$ c. $\frac{28x^2-x-15}{28x^2-x-15}$ d. $\frac{x^2+4x}{2x+8}$

$$\frac{(x+3)^2}{(x+3)(x-3)}$$

$$\frac{(x+3)(x+3)}{(x+3)(x-3)}$$

$= 1$

Week 11 Classwork:
Warm up
Pink (#13 - 21)
Purple (# 37 - 38)
Salmon (#57 - 61)
today's: (#70 - 76)

March 03, 2017

CP's: 3- #85 ---> 87, 88cf (yellow ws)

# 3.2.3 How can I rewrite it?

## Multiplying and Dividing Rational Expressions

You know how to multiply and divide fractions. But what if the fractions have variables in them? That is, what if they are rational expressions? Is the process the same? Today you will learn how to multiply and divide rational expressions and will continue to practice simplifying rational expressions.

3-85. Review your work from yesterday by simplifying the rational expression below using a "Giant One." What are the excluded values of $x$? (That is, what values can $x$ *not* be?)

$$\frac{3x^2+11x-4}{2x^2+11x+12}$$

you can not cancel the $\frac{11x}{11x}$ !

3-86. With your team, review your responses to homework problem 3-84. Verify that everyone obtained the same answers and be prepared to share with the class how you multiplied and divided the fractions below.

$\frac{2}{3} \cdot \frac{9}{14}$ $\frac{3}{5} \div \frac{12}{25}$

3-87. Use your understanding of multiplying and dividing fractions to rewrite the expressions below. Then look for "Giant Ones" and simplify. For each rational expression, also state any values of the variables that would make the denominator zero.

a. $\frac{4x+3}{x-5} \cdot \frac{x-5}{x+3}$

b. $\frac{x+2}{9x-1} \div \frac{2x+1}{9x-1}$

c. $\frac{2m+3}{3m-2} \cdot \frac{7+4m}{3+2m}$

d. $\frac{(y-2)^3}{3y} \cdot \frac{y+5}{(y+2)(y-2)}$

e. $\frac{15x^3}{3y} \div \frac{10x^2y}{4y^2}$

f. $\frac{(5x-2)(3x+1)}{(2x-3)^2} \div \frac{(5x-2)(x-4)}{(x-4)(2x-3)}$

88 c & f

HW: 3 -

# 90 ---> 96